



Whole grain intake, definition and database development: the Baltimore Longitudinal Study of Aging

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ABSTRACT

Objective: To identify major dietary sources of whole grains, show changes in intakes over time, and describe the construction of a database of whole grain content of foods.

Design: Dietary data were collected using 7-d diet records during four time periods (1961-1965; 1968-1975; 1984-1991; and 1993-present). All foods or mixed dishes containing grains were identified. The Pyramid Servings database and CSFII recipe ingredients database were then used to calculate both servings and gram weights of whole grain intakes.

Subjects: Men and women in the Baltimore Longitudinal Study of Aging, mean age 62.1 ± 16.0 years, who participated in the dietary assessment portion of the study ($n = 1579$).

Statistical analyses: We divided our sample according to decade of visit and calculated mean intakes of whole grains, refined grains, and total grains for each time period. We also calculated the frequency of intake for major whole grain food groups and the whole grain content for each group.

Results: Intakes of whole grains increased from 14 g/d in the 1960s to 33 g/d in the 2000s. Top contributors of whole grain were "other" high fiber cereal (other than oat or bran cereals), oat/bran cereal, and multi-grain bread.

Conclusions: Our data suggest that despite modest increases in the consumption of whole grains over the past four decades, intakes remain low. While more research is clearly needed to better understand the benefits of whole grains in promoting health and preventing disease, the development of research tools, including databases to accurately assess whole grain intake, is a critical step in completing such research.

OBJECTIVE

To create a whole grain database to analyze and describe the nutritional status and food intake patterns of participants in the Baltimore Longitudinal Study of Aging. An important goal of building the whole grains database was to use the dietary data from the 7-d dietary records to estimate grain intakes in gram weights per day, rather than servings per day.

BACKGROUND AND METHODS

□ Dietary data were collected by 7-day diet records during four time periods: 1961-1965; 1968-1975; 1984-1991; and 1993 to the present time.

□ A whole grains database was created separately for each time period, allowing for adjustment of whole grain content over time.

□ All foods containing grains, either whole or refined, were assigned a pyramid code from the Pyramid Servings Database for USDA Survey Food Codes version 2.0, a USDA reference database of servings per 100 g from 30 food groups, which include three grain groups (total grain, whole grain, and non-whole grain).

□ Recipes or mixed dishes were merged to the CSFII 1994-96 recipe database to disaggregate whole foods into ingredients and to obtain gram weights of individual ingredients.

□ For foods unable to be disaggregated to the ingredient level the standard reference value was used. Specifically, a grain serving of one slice of bread contains 16 g, and a grain serving of one serving of cereal contains 28 g.

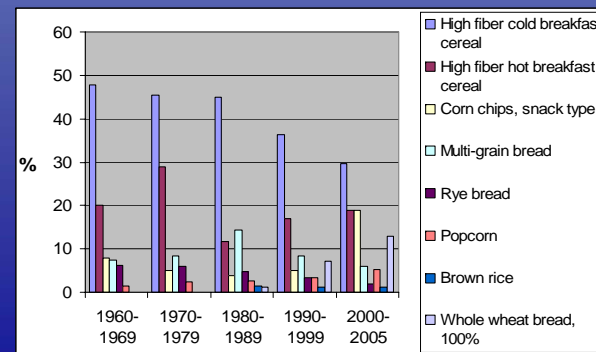
RESULTS

Whole grain per serving, total grams and standard serving sizes for major food groups contributing to whole grain intake

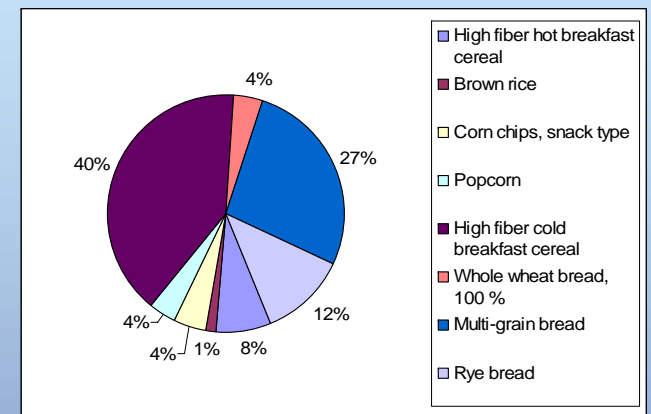
Food group	Whole grain per serving (g, mean \pm SD)	Total grams per serving (g, mean \pm SD)	Standard serving size ¹
High fiber hot breakfast cereal	41 \pm 30	180 \pm 102	1 cup = 234 g
Brown rice	22 \pm 15	131 \pm 92	½ cup = 98 g
Corn chips, snack type	29 \pm 39	44 \pm 56	1 oz = 28 g
Popcorn	26 \pm 30	32 \pm 33	3 cups = 24 g
High fiber cold breakfast cereal	27 \pm 22	35 \pm 26	½ cup = 15 g
Whole wheat bread, 100 %	26 \pm 11	48 \pm 21	1 slice = 28 g
Multi-grain bread	10 \pm 6	46 \pm 24	1 slice = 26g
Rye bread	11 \pm 6	47 \pm 25	1 slice = 32g

¹ Based on the Food Guide Pyramid definitions.

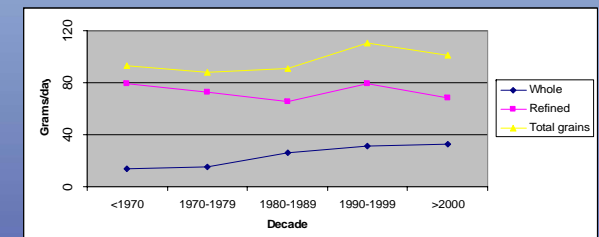
Major food group contributors to whole grain intakes and % contribution to intakes of adults in the BLSA, by decade



Whole grain frequency of consumption for major food groups contributing to whole grain intake



Mean intakes of whole grain in grams per day, by decade



CONCLUSIONS

□ Our data suggest that despite an increase in the use of whole grains over the past four decades, intakes remain low in this population of aging adults.

□ Whole grains are rich in many important nutrients, including B vitamins, folate, antioxidants, minerals, lignans, and phenolic compounds, which have been associated with reduced risk of cancer, obesity, diabetes and heart disease.

□ While more research is clearly needed to better understand the benefits of whole grains in promoting health and preventing disease and to better understand the biological mechanisms involved, the development of research tools, including databases to accurately assess whole grain intake, is a critical step in completing such research.

□ Further steps are also needed to develop whole grain guidelines, to establish FDA labeling laws to regulate food companies that produce whole grain products, and to increase consumer education to promote the consumption of whole grains.